REMARKS

The present response is to the Office Action mailed in the above referenced case on July 20, 2004. Claims 1-21 are presented below for examination. Claims 1-2, 5-9, 12-16 and 19-21 are rejected under 35 U.S.C 102(e) as being anticipated by Baldwin et al. (6,560, 448), hereinafter Baldwin. Claims 3-4, 10-11 and 17-18 are rejected under 35 U.S.C 103(a) as being unpatentable over Baldwin.

Applicant has carefully studied the prior art cited and applied by the Examiner, and the Examiner's rejections and statements of the instant office action. In response, applicant provides argument that the reference of Baldwin fails to disclose all of the limitations of applicant's claims, which is required for a prima facie rejection. Applicant points out and argues the key and patentable limitations of applicant's claims which clearly and unarguably distinguish applicant's invention over that of the prior art provided.

In the Examiner's remarks in the instant office action, the Examiner has stated that, as per claims 1, 5-8, 12-15 and 19-21, Baldwin discloses applicant's broadband receiving/transmitting system, having an antenna for receiving or transmitting RF signals in a broadband spectrum, including a first number of signal bands, conversion circuitry coupled to the first number of signal bands, modulation circuitry coupled to the IC for receiving or transmitting each of the bands at a common intermediate frequency, wherein the conversion IC comprises a plurality of circuit elements one for each of the frequency bands to and from an intermediate frequency, and a second number of on-chip voltage-controlled oscillators (VCO's) coupled to the circuit elements for generating local-oscillator (LO) signals to the circuit elements for conversion between the IF frequency and the receive or transmit frequency for each band, the second number less than the first number. Applicant respectfully traverses the Examiner's statement.

Applicant now wishes to direct the Examiner's attention to applicant's claim 1, reproduced below for convenience.

1. (Original) A conversion integrated circuit (IC) for RF signals, comprising;

a first interface for transmitting or receiving a first number of distinct RF frequency bands in a broadband spectrum;

a plurality of circuit elements coupled to the first interface, one for each of the frequency bands, for up-conversion or down-conversion of the frequency bands to and from an intermediate frequency (IF);

a second interface coupled to said circuit elements for receiving and transmitting at the intermediate frequency (IF); and

a second number of on-chip voltage-controlled oscillators (VCOs) coupled to the circuit elements for generating local-oscillator (LO) signals to the circuit elements for conversion between the IF frequency and the receive or transmit frequency for each band;

characterized in that the second number is smaller than the first number.

The claim language specifically recites a first interface for transmitting or receiving a first number of distinct RF frequency bands in a broadband spectrum as the first element of the claim language. The claim language also clearly and specifically recites a second number of on-chip voltage-controlled oscillators (VCO's) coupled to the circuit elements for generating local-oscillator (LO) signals, characterized in that the second number of VCO's is smaller than the first number of distinct RF frequency bands.

Firstly, applicant argues that Baldwin does not specifically disclose a first number of distinct RF frequency bands. Baldwin discloses (col. 10, lines 41-43) "The target carrier frequencies are in the GHz range such as 2-5 GHz ranges and higher, although the present invention is not limited to any particular frequency range". It is clear that Baldwin provides no specific teaching of a first number of distinct RF frequency bands for up-conversion or down-conversion.

Utilizing conventional methods according to prior art, for transmitting and receiving signals over the entire frequency range (2.15 GHz and 5.825 GHz), while achieving acceptable phase noise, a mixer for up- and down-conversion of each of the four bands must be served by a separate VCO for each band in order to cover all of the frequency bands, since none of the frequency bands can be combined due to the limited

16 % tuning range of on-chip VCOs available in current technology. Applicant's invention solves this problem by utilizing new and novel practices for providing the local oscillator (LO) signals required for synthesizing four separate signal bands, and achieves the required frequencies using fewer than that number of on-chip voltage controlled oscillators (VCO's).

Applicant's invention, referring now to applicant's figure 1, accomplishes the desired result by achieving the wide frequency range utilizing a system based on frequency doubling and quadrupling coupled with practice of upper or lower sideband selection principles. The up-conversion and down-conversion for outgoing and incoming signals is accomplished by circuits providing an electronic interface between each of the four frequency bands 106, and the IF signals 124. As shown in figure 1, circuitry is dedicated to each of the four frequency bands, circuit 131 provided for band 1 of the broadband spectrum, and circuit 132,133, and 134 dedicated for frequency bands 2, 3 and 4 respectively. The LO signals are generated by only two on-chip VCO's (110,112) each having the limited tuning range and voltage capacitance available from on-chip or varactors of current technology. Lo signals from VCO's 110 and 112 are provided via electronic connection to circuits 131-134, and in some cases by doubling or quadrupling to circuitry within device 101, enabling conversion to or from the intermediate frequency of 350 MHz.

Applicant must also emphasize to the Examiner that applicant's claim 1 specifically recites on-chip VCO's, meaning they are integrated into the circuitry of device 101. In conventional art, the traditional method for increasing the frequency tuning range of a VCO while maintaining an acceptable phase noise level is by utilizing off-chip circuitry comprising high-quality conductors and tuning varactors that have a very high tuning range, and are designed to operate with a high supply voltage of typically 30 volts. Applicant's invention addresses this problem of increased cost of additional external components needed, by integrating the VCO's into the circuitry of the chip.

The invention of Baldwin, in contrast, does not teach on-chip VCO's at all. Baldwin discloses (col. 8, line 25) an external VCO (229) which provides an output LO signal at approximately 4.8 GHz to a phase lock loop (PLL) 231 and input of an I/Q LO

signal generator 227. VCO 229 is clearly external to the circuitry of the device of Baldwin, which teaches away from applicant's invention as argued above.

It is clear to applicant that Baldwin teaches an alternative invention which addresses a similar problem in an alternative fashion from the manner in which applicant's invention achieves the expected result. Applicant wishes to emphasize that it is the claims that must be examined in light of the prior art, not the problem sought to be solved. An invention by another that solves the problem that applicant's invention solves does not necessarily anticipate applicant's invention. It is axiomatic that anticipation of a claim under Section 102 can be found only if the prior art reference discloses every element of the claim. In re King, 801 F.2d 1324, 1326, 231 USPQ 136 138 (Fed. Circ. 1986). See also Lindemann Machinenfabrik GMBH vs. American Hoist and Derrick, 730 F.2d 1452, 1458, 221 USPQ 481 485 (Fed. Circ. 1984). In this case the prior art cited and applied by the Examiner clearly fails as a primary reference because, as pointed out above by applicant, Baldwin fails to disclose each and every element of applicant's independent claims, which is required for a prima facie rejection.

Applicant therefore believes that claim 1 is then clearly and unarguably patentable over the primary reference of Baldwin. Applicant's independent claims 8 and 15 recites applicant's broadband receiving/transmitting system and method for providing local oscillator (LO) signals to a first number of sideband-selection circuit elements in accordance with the limitations of claim 1, and also recite a first number of frequency signal bands and a second number of on-chip VCO's, the second number being smaller than the first number. As argued above on behalf of claim 1, claims 8 and 15 or therefore also clearly patentable over the art of Baldwin. Claims 2-7, 9-14 and 16-21, all being depending claims, are then patentable on their own merits, or at least as depended from a patentable claim.

As all of the claims standing for examination have been shown to be patentable over the art of record, applicant respectfully requests reconsideration, and that the present case be passed quickly to issue. If there are any time extensions needed beyond any extension specifically requested with this response, such extension of time is hereby

requested. If there are any fees due beyond any fees paid with this amendment, authorization is given to deduct such fees from deposit account 50-0534.

Respectfully Submitted,
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